

What is claimed is:

- 1 1. A method for creating a color transformation table
2 correlating a color signal outputted from a color input
3 device in a color space of said color input device
4 (hereinafter referred to as a transformation source
5 color space) with a color signal in a color space
6 (hereinafter referred to as a transformation target
7 color space) which is different from said
8 transformation source color space, comprising the
9 steps of:
10 a dividing step of beforehand defining a
11 plurality of regions obtained by dividing the whole
12 of said transformation target color space; and
13 a color transformation table creating step of
14 creating said color transformation table by using a
15 plurality of color transformation formulas
16 corresponding to said plural regions, respectively,
17 said plural regions being defined at said dividing
18 step.
- 1 2. The color transformation table creating method
2 according to claim 1 further comprising the steps of:
3 a reading step of reading a plurality of color
4 regions on a color chart by said color input device,
5 and outputting a color signal in said transformation
6 target color space corresponding to each of said color

7 regions from said color input device;
8 a colorimetric step of measuring said
9 plurality of color regions by a colorimeter, and
10 outputting spectral reflectance corresponding to each
11 of said color regions from said colorimeter;
12 a classifying step of classifying said
13 spectral reflectance according to which region among
14 said plural regions in said transformation target color
15 space a color signal in said transformation target
16 color space corresponding to said spectral reflectance
17 belongs to; and
18 a spectral characteristics estimating step of
19 estimating spectral characteristics of said color
20 input device on the basis of said color signal outputted
21 from said color input device at said reading step and
22 said spectral reflectance outputted from said
23 colorimeter at said colorimetric step;
24 wherein, at said color transformation table
25 creating step, said color transformation formula is
26 created for each of said regions in said transformation
27 target color space on the basis of said spectral
28 reflectance classified at said classifying step and
29 said spectral characteristics estimated at said
30 spectral characteristics estimating step.

1 3. The color transformation table creating method
2 according to claim 1, wherein said color transformation

3 table creating step comprises:
4 a relationship creating step of creating a
5 relationship between a color signal in said
6 transformation source color space and a color signal
7 in said transformation target color space by using said
8 color transformation formula according to each region,
9 for each of said color transformation formulas; and
10 a creation processing step of creating said
11 color transformation table on the basis of said
12 relationship created for each of said color
13 transformation formulas at said relationship creating
14 step.

1 4. The color transformation table creating method
2 according to claim 2, wherein said color transformation
3 table creating step comprises:
4 a relationship creating step of creating a
5 relationship between a color signal in said
6 transformation source color space and a color signal
7 in said transformation target color space by using said
8 color transformation formula according to each region,
9 for each of said color transformation formulas; and
10 a creation processing step of creating said
11 color transformation table on the basis of said
12 relationship created for each of said color
13 transformation formulas at said relationship creating
14 step.

1 5. The color transformation table creating method
2 according to claim 1, wherein said transformation
3 target color space is a uniform color space.

1 6. The color transformation table creating method
2 according to claim 1, wherein said plural regions have
3 regions overlapping on each other.

1 7. The color transformation table creating method
2 according to claim 1, wherein, at said dividing step,
3 the whole of said transformation target color space
4 is divided according to hue angle to provide said plural
5 regions.

1 8. The color transformation table creating method
2 according to claim 1, wherein, at said dividing step,
3 the whole of said transformation target color space
4 is divided according to chroma to provide said plural
5 regions.

1 9. The color transformation table creating method
2 according to claim 1, wherein, at said dividing step,
3 the whole of said transformation target color space
4 is divided according to lightness to provide said
5 plural regions.

1 10. The color transformation table creating method
2 according to claim 3, wherein said color transformation
3 table creating step further comprises a determining
4 step of determining that a color transformation result
5 is correct when said color transformation result, into
6 which one color signal in said transformation source
7 color space is transformed through a color
8 transformation formula when said relationship is
9 created at said relationship creating step, belongs
10 to a region corresponding to said color transformation
11 formula;

12 wherein, at said creation processing step,
13 said color transformation table is created on the basis
14 of said color transformation result determined to be
15 correct at said determining step.

1 11. The color transformation table creating method
2 according to claim 4, wherein said color transformation
3 table creating step further comprises a determining
4 step of determining that a color transformation result
5 is correct when said color transformation result, into
6 which one color signal in said transformation source
7 color space is transformed through a color
8 transformation formula when said relationship is
9 created at said relationship creating step, belongs
10 to a region corresponding to said color transformation
11 formula;

12 wherein, at said creation processing step,
13 said color transformation table is created on the basis
14 of said color transformation result determined to be
15 correct at said determining step.

1 12. The color transformation table creating method
2 according to claim 10, wherein when there are a
3 plurality of color transformation results determined
4 to be correct with respect to said one color signal
5 at said determining step, a color transformation result
6 with respect to said one color signal is calculated
7 at said creation processing step on the basis of values
8 relating to distances between said plural color
9 transformation results determined to be correct and
10 boundaries of said regions to which said plural color
11 transformation results belong.

1 13. The color transformation table creating method
2 according to claim 11, wherein when there are a
3 plurality of color transformation results determined
4 to be correct with respect to said one color signal
5 at said determining step, a color transformation result
6 with respect to said one color signal is calculated
7 at said creation processing step on the basis of values
8 relating to distances between said plural color
9 transformation results determined to be correct and
10 boundaries of said regions to which said plural color

11 transformation results belong.

1 14. The color transformation table creating method
2 according to claim 10, wherein when there are a
3 plurality of color transformation results with respect
4 to said one color signal determined to be correct at
5 said determining step, one of said plural color
6 transformation results determined to be correct is
7 selected as a color transformation result with respect
8 to said one color signal at said creation processing
9 step on the basis of values relating to distances
10 between said plural color transformation results
11 determined to be correct and boundaries of said regions
12 to which said plural color transformation results
13 belong.

1 15. The color transformation table creating method
2 according to claim 11, wherein when there are a
3 plurality of color transformation results with respect
4 to said one color signal determined to be correct at
5 said determining step, one of said plural color
6 transformation results determined to be correct is
7 selected as a color transformation result with respect
8 to said one color signal at said creation processing
9 step on the basis of values relating to distances
10 between said plural color transformation results
11 determined to be correct and boundaries of said regions

12 to which said plural color transformation results
13 belong.

1 16. The color transformation table creating method
2 according to claim 10, wherein when there is no color
3 transformation result with respect to said one color
4 signal determined to be correct at said determining
5 step, a color transformation result with respect to
6 said color signal is calculated at said creation
7 processing step on the basis of reciprocals of values
8 relating to distances between said plural color
9 transformation results obtained with respect to said
10 color signal at said relationship creating step and
11 boundaries of said regions to which said respective
12 color transformation results belong.

1 17. The color transformation table creating method
2 according to claim 11, wherein when there is no color
3 transformation result with respect to said one color
4 signal determined to be correct at said determining
5 step, a color transformation result with respect to
6 said color signal is calculated at said creation
7 processing step on the basis of reciprocals of values
8 relating to distances between said plural color
9 transformation results obtained with respect to said
10 color signal at said relationship creating step and
11 boundaries of said regions to which said respective

12 color transformation results belong.

1 18. The color transformation table creating method
2 according to claim 10, wherein there is no color
3 transformation result with respect to said one color
4 signal determined to be correct at said determining
5 step, one of a plurality of color transformation
6 results is selected as a color transformation result
7 with respect to said one color signal at said creation
8 processing step on the basis of reciprocals of values
9 relating to distances between said plural color
10 transformation results obtained with respect to said
11 color signal at said relationship creating step and
12 boundaries of said regions to which said plural color
13 transformation results belong.

1 19. The color transformation table creating method
2 according to claim 11, wherein there is no color
3 transformation result with respect to said one color
4 signal determined to be correct at said determining
5 step, one of a plurality of color transformation
6 results is selected as a color transformation result
7 with respect to said one color signal at said creation
8 processing step on the basis of reciprocals of values
9 relating to distances between said plural color
10 transformation results obtained with respect to said
11 color signal at said relationship creating step and

12 boundaries of said regions to which said plural color
13 transformation results belong.

1 20. The color transformation table creating method
2 according to claim 10, wherein said color
3 transformation table correlates a color signal in said
4 transformation source color space with spectral
5 reflectance according to a color transformation result
6 as a color signal in said transformation target color
7 space.

1 21. The color transformation table creating method
2 according to claim 11, wherein said color
3 transformation table correlates a color signal in said
4 transformation source color space with spectral
5 reflectance according to a color transformation result
6 as a color signal in said transformation destination
7 color space.

1 22. The color transformation table creating method
2 according to claim 20, wherein when there are a
3 plurality of color transformation results with respect
4 to said one color signal determined to be correct at
5 said determining step, spectral reflectance of said
6 one color signal is calculated at said creation
7 processing step on the basis of values relating to
8 distances between said plural color transformation

9 results determined to be correct and boundaries of said
10 regions to which said plural color transformation
11 results belong.

1 23. The color transformation table creating method
2 according to claim 21, wherein when there are a
3 plurality of color transformation results with respect
4 to said one color signal determined to be correct at
5 said determining step, spectral reflectance of said
6 one color signal is calculated at said creation
7 processing step on the basis of values relating to
8 distances between said plural color transformation
9 results determined to be correct and boundaries of said
10 regions to which said plural color transformation
11 results belong.

1 24. An apparatus for creating a color transformation
2 table correlating a color signal outputted from a color
3 input device in a color space (hereinafter referred
4 to as a transformation source color space) of said color
5 input device with a color signal in a color space
6 (hereinafter referred to as a transformation target
7 color space) which is different from said
8 transformation source color space, comprising:
9 a color transformation table creation unit for
10 creating said color transformation table by using a
11 plurality of color transformation formulas

12 corresponding to a plurality of regions, respectively,
13 said regions being obtained by dividing said
14 transformation target color space.

1 25. The color transformation table creating apparatus
2 according to claim 24 further comprising:

3 an input unit for inputting a color signal in
4 said transformation source color space corresponding
5 to each of a plurality of color regions on a color chart,
6 said color signal being obtained by reading said color
7 regions by said color input device;

8 a colorimeter for measuring said plurality of
9 color regions to obtain spectral reflectance
10 corresponding to each of said color regions;

11 a classification unit for classifying said
12 spectral reflectance according to which region among
13 said plural regions in said transformation target color
14 space a color signal in said transformation target
15 color space corresponding to said spectral reflectance
16 belongs to; and

17 a spectral characteristics estimation unit for
18 estimating spectral characteristics of said color
19 input device on the basis of said color signal inputted
20 from said input unit and said spectral reflectance
21 obtained by said colorimeter;

22 wherein said color transformation table
23 creation unit creates a color transformation formula

24 for each of said regions in said transformation target
25 color space on the basis of said spectral reflectance
26 classified by said classification unit and said
27 spectral characteristics estimated by said spectral
28 characteristics estimation unit.

1 26. The color transformation table creating apparatus
2 according to claim 24, wherein said color
3 transformation table creating unit comprises:

4 a relationship creation unit for creating a
5 relationship between a color signal in said
6 transformation source color space and a color signal
7 in said transformation target color space by using said
8 color transformation formula according to each region,
9 for each of said color transformation formulas; and

10 a creation process unit for obtaining a
11 relationship on the basis of plural relationships
12 created by using said plural color transformation
13 formulas in said relationship creation unit to create
14 said color transformation table.

1 27. The color transformation table creating apparatus
2 according to claim 25, wherein said color
3 transformation table creating unit comprises:

4 a relationship creation unit for creating a
5 relationship between a color signal in said
6 transformation source color space and a color signal

7 in said transformation target color space by using said
8 color transformation formula according to each region,
9 for each of said color transformation formulas; and
10 a creation process unit for obtaining a
11 relationship on the basis of plural relationships
12 created by using said plural color transformation
13 formulas in said relationship creation unit to create
14 said color transformation table.

1 28. A computer readable record medium in which a color
2 transformation table creating program for making a
3 computer realize a function of creating a color
4 transformation table correlating a color signal
5 outputted from a color input device in a color space
6 of said color input device (hereinafter referred to
7 as a transformation source color space) with a color
8 signal in a color space (hereinafter referred to as
9 a transformation target color space) which is different
10 from said transformation source color space is
11 recorded;

12 said color transformation table creating
13 program making said computer function as:

14 a color transformation table creation
15 unit for creating said color transformation table by
16 using a plurality of color transformation formulas
17 corresponding to a plurality of regions, respectively,
18 said regions being obtained by dividing said

19 transformation target color space.

1 29. The computer readable record medium in which a
2 color transformation table creating program is
3 recorded according to claim 28, wherein said color
4 transformation table creating program makes said
5 computer further function as:

6 a classification unit for classifying spectral
7 reflectance according to which region among said plural
8 regions in said transformation target color space a
9 color signal in said transformation target color space
10 corresponding to said spectral reflectance belongs to,
11 said spectral reflectance being obtained by measuring
12 each of a plurality of color regions on a color chart
13 by a colorimeter; and

14 a spectral characteristics estimation unit for
15 estimating spectral characteristics of said color
16 input device on the basis of a color signal in said
17 transformation target color space obtained for each
18 of said color regions by reading said plurality of color
19 regions by said color input device and said spectral
20 reflectance obtained by said colorimeter;

21 wherein when said color transformation table
22 creating program makes said computer function as said
23 color transformation table creation unit, said color
24 transformation formula is created for each of said
25 regions in said transformation target color space on

26 the basis of said spectral reflectance classified by
27 said classification unit and said spectral
28 characteristics estimated by said spectral
29 characteristics estimation unit.

1 30. The computer readable record medium in which a
2 color transformation table creating program is
3 recorded according to claim 28, wherein when said color
4 transformation table creating program makes said
5 computer function as said color transformation table
6 creation unit, said color transformation table
7 creating program makes said computer function as:

8 a relationship creation unit for creating a
9 relationship between a color signal in said
10 transformation source color space and a color signal
11 in said transformation target color space by using said
12 color transformation formula according to each of said
13 regions, for each of said color transformation
14 formulas; and

15 a creation process unit for obtaining a
16 relationship on the basis of plural relationships
17 created by using said plural color transformation
18 formulas in said relationship creation unit to create
19 said color transformation table.

1 31. The computer readable record medium in which a
2 color transformation table creating program is

3 recorded according to claim 29, wherein when said color
4 transformation table creating program makes said
5 computer function as said color transformation table
6 creation unit, said color transformation table
7 creating program makes said computer function as:
8 a relationship creation unit for creating a
9 relationship between a color signal in said
10 transformation source color space and a color signal
11 in said transformation target color space by using said
12 color transformation formula according to each of said
13 regions, for each of said color transformation
14 formulas; and
15 a creation process unit for obtaining a
16 relationship on the basis of plural relationships
17 created by using said plural color transformation
18 formulas in said relationship creation unit to create
19 said color transformation table.